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THE RELATIONSHIP BETWEEN CIGARETTE SMOKING AND OTHER POOR

HEALTH BEHAVIORS IN A YOUNG ADULT POPULATION

By

WALTER MARK MATTHEWS, BA, MD

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DEDICATION

To

My wife, Monica, and my children, Kaelyn and Brooke, whose selfless sacrifice during my

career and this effort has made me the physician and officer I am today.

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THESIS

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THE RELATIONSHIP BETWEEN CIGARETTE SMOKING AND OTHER POOR

HEALTH BEHAVIORS IN A YOUNG ADULT POPULATION

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This study examines the relationship between smoking and other poor health behaviors in a young adult population. This study hypothesizes that, for a young adult population, there is no correlation between smoking and other bad health behaviors. The population under study is United States Air Force active duty members between the ages of 20-30 who have responded to the Health Enrollment Assessment Review survey (HEAR). Responses from this non-anonymous survey are analyzed using Spearman's Rho to examine the relationship between bad health behaviors. Results of the Spearman's Rho analysis show a statistically significant correlation for five of the six risky health behavior pairs (only the Exercise/Physical Activity vs. Driving Under the Influence of Alcohol pair was found to be non-significant). Though these correlations are statistically significant, they are weak, and judged to be clinically irrelevant.

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GENERAL STUDY DESIGN

This study investigated possible relationships among risky health behaviors in a young adult population, with a particular emphasis on the correlation of smoking with other risky health behaviors. The four risky health behaviors studied are defined below. All data has been obtained from the USAF Health Enrollment Assessment Review (HEAR) survey.

VARIABLES

$s =$ Number of cigarettes smoked per day

$e =$ Frequency of exercise/physical activity

$a =$ Frequency of alcohol consumption

$d =$ Frequency of driving under the influence of alcohol

$r =$ Spearman's rank order correlation coefficient

$z =$ Risky health behavior; can represent (s), (e), (a), or (d)

NULL AND ALTERNATIVE HYPOTHESES

$H_0 : r_{s, z} = 0$ There is no correlation between smoking and other studied risky health behaviors.

$H_A : r_{s, z} \neq 0$ There is a correlation between smoking and other studied risky health behaviors.

$H_0 : r_{e, z} = 0$ There is no correlation between frequency of exercise/physical activity and other studied risky health behaviors.

$H_A : r_{e, z} \neq 0$ There is a correlation between frequency of exercise/physical activity and other studied risky health behaviors.

$H_0 : r_{a, z} = 0$ There is no correlation between frequency of alcohol consumption and other studied risky health behaviors.

$H_A : r_{a, z} \neq 0$ There is a correlation between frequency of alcohol consumption and other studied risky health behaviors.

$H_0 : r_{d, z} = 0$ There is no correlation between frequency of driving under the influence of alcohol and other studied risky health behaviors.

$H_A : r_{d, z} \neq 0$ There is a correlation between frequency of driving under the influence of alcohol and other studied risky health behaviors.

Correlation coefficients (r) were calculated using Spearman's Rho non-parametric method, as all data is ordinal.

BACKGROUND

INTRODUCTION

Cigarette smoking is one of the most vexing issues facing physicians in modern medical practice. In particular, primary care physicians are faced with the task of broaching the issue of tobacco cessation with resistant, even hostile patients. This bitterness on the part of some patients is not surprising. According to Russell, Blumberg found that clients at a methadone clinic rated cigarettes their "most needed drug" ahead of heroine, methadone, barbiturates, amphetamines, marijuana, alcohol, and coffee [6]. In fact, Murad the Cruel of Turkey (1623-1640) outlawed tobacco smoking, and would punish offenders by piercing their nose with the stem of a tobacco pipe. Even the threat of this brutal torture did not stop the spread of tobacco in this ruler's country [7]. In light of tobacco's obvious addiction potential, it is easy to see how medical advice addressing cigarette smoking might be ignored.

The issue of cigarette smoking is particularly problematic when dealing with young, healthy individuals. After all, a 60 year-old man with chronic obstructive pulmonary disease is a relatively 'easy sell' on the benefits of quitting smoking (regardless whether he actually

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quits). But how do you explain the dangers of smoking to an 'invulnerable' 25 year-old athlete? Warnings about future shortness of breath, chest pain, swollen legs and impotence ring shallow in his Adonis-like ears; risks of insensate maladies such as lung cancer, osteoporosis and hearing loss are likely ignored. Silvis and Perry found that "although 90% of adolescents are aware that smoking is a health hazard, few believe that it is a threat to *their health*" [7]. It is reasonable to believe that this denial persists into young adulthood.

How can we engage this young healthy patient on the issue of cigarette smoking? We do it by hitting him where he lives, tying his smoking behavior to other very real, very bad health behaviors that happen *now*, not 20 years in the future. If a link could be shown between cigarette smoking and other bad health behaviors, such as alcohol abuse, driving under the influence of alcohol, and lack of physical exercise, we might be able to demonstrate a present, palpable detriment to the patient.

CHILDREN/ADOLESCENTS AND CIGARETTE EXPOSURE

There is a plethora of literature pertaining to children/adolescents and cigarette use and exposure. For instance, Thomas and Thomas reviewed ways family physicians and pediatricians can help prevent children from smoking. They believe a child progresses through a five-stage process in becoming a smoker: anticipation, initiation, experimentation, habituation, and adult smoking. As many young adult smokers begin as adolescent smokers, this process is important to understand. The authors also outlined various identifiers for children at risk for smoking, as well as specific steps physicians can take to encourage children to remain non-smokers [8]. Silvis and Perry have written an extensive review of pediatric tobacco use, including tools physicians can use to prevent a patient from smoking, and to maintain his/her non-smoker status. They also review the effects of fetal exposure to nicotine through maternal smoking, demonstrating a dose-response relationship between gestational smoking and more severe developmental impairment and higher infant mortality. In addition, they show how childhood smoke exposure impairs physical and mental development (using height and academic grades, respectively). In addressing the physical effects of primary tobacco use in adolescents, the authors state, "the social and behavioral correlates of teen-age smoking are of greater concern than immediate physical

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consequences". The authors show that smoking in early adolescence is a strong predictor of more dangerous behavior in late adolescence, including alcohol abuse, promiscuity, and reckless driving [7]. The proposed study will attempt to show the same is true for young adults.

MIDDLE-AGED AND ELDERLY ADULT EXPOSURE TO CIGARETTES

There is an even greater amount of literature describing the specific health effects of smoking in middle-aged to elderly adults. The American Council on Science and Health has compiled a comprehensive review of the health consequences of smoking entitled, Cigarettes: What the Warning Label Doesn't Tell You. The editors have compiled the current medical thought pertaining to smoking and its effects on 20 different body systems and organs, including common myths about smoking and their rebuttals. The text delineates both established and suspected effects of smoking, providing an excellent review of the specific disease effects caused by cigarettes. As expected, this review naturally gravitates to diseases of middle and old age [1].

YOUNG ADULTS AND CIGARETTE EXPOSURE

Why do this study now? Well, surprisingly enough, the peer-reviewed literature has not as yet examined the relationship between smoking and other poor health behaviors for young healthy adults. Somehow, young adults (age 20-30) have been dramatically under-represented in the smoking literature. This oversight is possibly due to the lack of interface between young adults and the medical establishment. Young adults simply do not present to a primary care physician as frequently as children and older adults. In addition, the lack of presentation of specific disease states arising from smoking leads the medical body to unconsciously put this group's smoking behavior 'on the back burner'. For example: a 58 year-old male smoker may present to his physician with a viral upper respiratory illness, and end up discussing his hypertension and lack of exercise with his doctor. This discussion will naturally lead to the issue of cigarette smoking and the need to quit. At the same time, a 25 year-old male smoker with a viral upper respiratory illness will take an over-the-counter cold medicine and go play basketball, never engaging a physician in a discussion about his smoking behavior.

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As might be expected, the literature that does address young adult smoking does so in an occupational setting. In a study examining the impact of smoke-free worksites on cigarette consumption in the United States and Australia, smoking declined almost universally in workplaces designated as "smoke-free", regardless the smoking areas provided for the employees. Of the 19 studies reviewed by the authors, 18 reported declines in daily smoking rates among employees, and 17 reported declines in smoking prevalence [2].

Although not specifically profiling young adults, it is reasonable to expect the social determinants affecting smoking habits at work would affect both young and older adults. As adolescents are heavily swayed by social determinants in smoking [7], young adults may perhaps be more likely than older adults to adhere to new social norms at the worksite (although this is purely speculation).

There are two studies (both currently being submitted for publication) dealing with smoking and its effects in the population considered in the proposed study. Robbins *et al.* looked first at the effect of smoking on hospitalizations and associated lost workdays [4], then at short-term costs attributable to smoking among USAF active duty members [5]. The first study found that, after adjusting for under-reporting of smoking, the population attributable fractions (PAFs; the fraction of the total population's health care expenditures attributable to causes associated with smoking) for outcomes not related to injury or pregnancy were (for men and women, respectively) at least 10.1% and 6.8% for hospitalization and at least 18.3% and 4.2% for lost work days [4]. For men in particular, this shows a substantial proportion of the hospitalizations among active duty Air Force members are due to smoking.

Robbins *et al.* next examined the short-term costs attributable to smoking. They found that the combined direct and indirect costs of smoking totaled $103.8 million per year ($91.0 million for males, $12.8 million for females) for active duty Air Force (ADAF) members. This represents 10% of all spending on direct health care for ADAF members annually. The number of duty days, or full-time equivalents (FTEs) lost due to smoking-related illness may exceed 3,400 per year [5]. Again, these numbers are for total active duty population in the USAF, and may be different for a subset of this population. However, it is

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obvious that smoking is a very costly habit for the USAF, including the subset of young

adults therein. It is therefore incumbent upon the scientific community to find and exploit

any link between smoking and other risky health behaviors.

CIGARETTES AND PREVENTION ISSUES

There are other reasons to delineate a possible link between smoking and other poor

health behaviors. Any information about poor health behaviors is beneficial in directing

prevention resources. For instance, if a link is found between smoking and alcohol abuse,

detoxification and counseling programs for alcohol abusers might be made more effective if

designed with an awareness of tobacco use. If a link between risky health behaviors were

demonstrated, physicians would be more alert to other risky behaviors by the presence of a

single bad behavior (i.e., a young adult smoker should be questioned also about exercise,

alcohol use, etc.).

CIGARETTES AND THE PUBLIC CONSCIOUSNESS

Public awareness of the relationship between smoking and other poor health

behaviors is also vital to the prevention effort. Although scientific literature rarely makes an

immediate impact on the public mind, it is the first step towards changing the public's

attitude about smoking in young adults. Changing the public's mind is also an important step

towards establishing stricter regulations regarding tobacco and alcohol. Drawing a link

between smoking and other bad health behaviors in young adults would be yet another

weapon in the armamentarium against 'Big Tobacco'.

VALIDITY OF THE HEAR SURVEY

The Office for Prevention and Health Services Assessment (OPHSA), a section of the

Air Force Medical Operations Agency (AFMOA), has generated two studies using the

HEAR survey data. In their analysis, Robbins *et al.* compared the smoking data taken from

the HEAR with that taken from the Worldwide Survey of Substance Abuse and Health

Behaviors among Military Personnel (WWS). The HEAR is a non-anonymous survey, as

opposed to the anonymous WWS. The HEAR requires identifiers, as it is used to determine

individuals at risk, and identify them to their primary health care provider for intervention.

Although this is a non-attributional survey, it may be seen as having punitive potential by

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those completing it, resulting in a possibility of under-reporting of self-perceived bad health behaviors. Robbins *et al.* found that the HEAR survey showed the prevalence of current smoking to be 27.3% among men and 21.1% among women. In the same years, the WWS found a prevalence of 38.2% and 29.8% among *US Army* men and women, respectively [4]. This may indicate a problem with self-reporting of bad health behaviors on the HEAR, and could lead to a type II error.

CONCLUSION

The relationship between cigarette smoking and other risky health behaviors needs to be examined and delineated for our young adult population. Today's young adult smoker is tomorrow's emphysematous patient with congestive heart failure. However, quitting tomorrow will be too late to prevent the long-term effects of smoking on this patient's health. Exposing the detrimental effects to a person's general health *today* will make a greater impact on smoking behavior than anything else we can do. Exposing the immediate effects of smoking will show that 20-year old athlete his risk of being out-of-shape, slobbering drunk and in jail for DUI. After all, a smoker must be motivated to quit, and casting smoking in a negative light among young adults (by decreasing social acceptability and shifting peer influence against smoking) has been shown to be a strong negative influence in young adult smoking.

METHODS

HUMAN SUBJECTS

Data from the extant database of the United States Air Force *Health Enrollment Assessment Review* (HEAR) was used (see Appendix B for sample survey). United States Air Force active duty members between the ages of 20 and 30 years were selected for inclusion in this study. All USAF active duty members are required to participate in this self-reporting survey. For this study, data from the HEAR was screened by database administrators for horizontal (multiple individual responses from the same base) and longitudinal (multiple responses in the same year) duplication. After screening, data was screened by USAF database administrators to remove all identifying information, so that no identifiers were provided to researchers. This proposed study protocol was formally exempted from IRB oversight under 32 CFR 219.101 (b) (4) by the Brooks Air Force Base Institutional Review Board (see Appendix A, Brooks AFB IRB Documentation).

DATA PROCESSING

HEAR survey data is collected by a self-reported survey administered through each USAF base's Physical Exams and Standards Section. The survey is offered to all TRICARE beneficiaries; active duty members are required to respond. Depending on the individual base, the survey may be completed in the Primary Care Manager's office, or may be taken home and completed by the member. If the survey is taken home, it is returned to TRICARE in a postage-paid envelope. The data is compiled by base-level TRICARE contractors, and is forwarded to USAF/OPHSA at Brooks AFB, TX.

PROTOCOL

A sample HEAR survey is included under Appendix B.

Alpha-numeric designations following questions and variables refer to HEAR survey questions, and can be correlated with the sample HEAR survey found in Appendix C

s – Number of cigarettes smoked per day

    0:     has not smoked at least 100 cigarettes in entire lifetime (G1)

    1:     has smoked at least 100 cigarettes in entire lifetime, but does not currently smoke at all (G2)

    2:     less than 1 per day (G3)   5:   21-40 per day

    3:     1-10 per day   6:   41 or more per day

    4:     11-20 per day   7:   Don't know (missing)

e - Frequency of exercise/physical activity

In an average week, how many times do you engage in physical activity (exercise or work which lasts at least 20 minutes without stopping and which is hard enough to make you breath heavier and your heart beat faster)? – D1

    0:    less than one time per week   2:   at least 3 times per week

    1:    1-2 times per week

a - Frequency of alcohol consumption

In the past two weeks, on how many days did you drink any alcoholic beverages, such as beer, wine or liquor?

    0:    (subjects that have not had an alcoholic beverage in past month – H1) + (subjects that have not had an alcoholic beverage in past two weeks – H2)

    1:    1-2 days (H2)

    2:    3-4 days

    3:    5-6 days

    4:    7 or more days

    5:    Don't know (missing data)

d - Frequency of driving under the influence of alcohol

> During the past month, how many times have you driven when perhaps you've
> had too much to drink?
>
> 0:   None (H4)
>
> 1:   1-2 times
>
> 2:   3-4 times
>
> 3:   5-6 times
>
> 4:   7 or more time
>
> 5:   Don't know, don't drive, or don't drink (no alcoholic beverages in last month –
> H1) (missing data)

DATA ANALYSIS

All data was manipulated within the constructs of SPSS® statistical package, Microsoft® Excel & Access 2000. The data set received from the HEAR survey consisted of 102,385 eligible cases. Spearman's Rho (used due to ordinal nature of data) was applied to the population to obtain correlation coefficients for the risky health behavior pairs previously described. Data was ranked according to degree of exposure to the risky health behavior. These correlation coefficients were assembled and have been presented as a correlation matrix. For each Spearman's Rho comparison, only cases that provided responses to both questions were considered valid. Non-responders were eliminated for the given comparison, but were considered valid for other comparisons for which a response is given.

Reporting bias (by individuals or base-level contractors) was not a factor. Smokers and non-smokers are equally likely to respond or fail to respond to the HEAR, as they receive and submit the survey in the same way. In addition, active duty members are required to submit the survey, and are asked to complete it in the primary care giver's office if not submitted from home. Base-level contractors are equally likely to submit smokers' and non-smokers' survey responses. Because there is no preference shown to either smokers or non-smokers, bias was not present.

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RESULTS

The population studied consisted of 102,385 valid cases (active duty USAF members between the ages of 20 and 30). For each risky health behavior comparison, cases were considered valid if responses were given for both questions in the comparison. Consequently, there was a different N for each comparison. Correlations were calculated for all combinations of risky health behaviors. The Spearman's Rho values with corresponding significance (p value) were assembled into a matrix (Table 1). Table 2 below shows the N and percentage of the total population considered valid for each comparison, as well as the N and percentage of missing values. Those correlations with a p value less than 0.05 were considered significant. The correlation value for self-comparison is accepted to be 1.00 by convention. All risky health behavior pairs were found to have a statistically significant correlation, with the exception of "Frequency of Exercise /Physical Activity vs. Frequency of Driving Under the Influence of Alcohol". However, all statistically significant correlations were quite small (the greatest correlation being only 0.148).

CORRELATION MATRIX	Number of Cigarettes Smoked per Day	Frequency of Exercise/Physical Activity	Frequency of Alcohol Consumption	Frequency of Driving Under the Influence of Alcohol
Number of Cigarettes Smoked per Day	1.00	-0.046 (0.000)	0.148 (0.000)	0.029 (0.000)
Frequency of Exercise/Physical Activity	-0.046 (0.000)	1.00	0.019 (0.000)	-0.004 (0.314)
Frequency of Alcohol Consumption	0.148 (0.000)	0.019 (0.000)	1.00	0.118 (0.000)
Frequency of Driving Under the Influence of Alcohol	0.029 (0.000)	-0.004 (0.314)	0.118 (0.000)	1.00

Table 1. Spearman's Rho Correlation Matrix for Risky Health Behaviors

(p value in parentheses)

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RISKY HEALTH BEHAVIOR PAIR	N OF VALID CASES	PERCENT OF TOTAL N	N OF MISSING CASES	PERCENT OF TOTAL N	N OF TOTAL CASES	SPEARMANS RHO
Number of Cigarettes smoked per day (s) vs. Frequency of Exercise/Physical Activity (e)	101672	0.993	713	0.007	102385	-0.046 (0.000)
Number of Cigarettes Smoked per Day (s) vs. Frequency of Alcohol Consumption (c)	62820	0.614	39565	0.386	102385	0.148 (0.000)
Number of Cigarettes Smoked per Day (s) vs. Freq. of Driving Under the Influence of Alcohol (d)	71007	69.4	31378	30.6	102385	0.029 (0.000)
Frequency of Exercise/Physical Activity (e) vs. Frequency of Alcohol Consumption (a)	62568	61.1	39817	38.9	102385	0.019 (0.000)
Frequency of Exercise/Physical Activity (e) vs. Freq. of Driving Under the Influence of Alcohol (d)	70711	69.1	31674	30.9	102385	-0.004 (0.314)
Frequency of Alcohol Consumption (a) vs. Freq. of Driving Under the Influence of Alcohol (d)	57951	56.6	44434	43.4	102385	0.118 (0.000)

Table 2. N of Valid and Missing Cases for Risky Health Behavior Pairs

RISKY HEALTH BEHAVIOR PAIR	INTERPRETATION	
Number of Cigarettes smoked per day (s) vs. Frequency of Exercise/Physical Activity (e)	There is a significant correlation between number of cigarettes smoked per day and frequency of exercise/physical activity	Reject the null
Number of Cigarettes Smoked per Day (s) vs. Frequency of Alcohol Consumption (c)	There is a significant correlation between number of cigarettes smoked per day and frequency of alcohol consumption.	Reject the null
Number of Cigarettes Smoked per Day (s) vs. Freq. of Driving Under the Influence of Alcohol (d)	There is a significant correlation between number of cigarettes smoked per day and frequency of driving under the influence of alcohol.	Reject the null
Frequency of Exercise/Physical Activity (e) vs. Frequency of Alcohol Consumption (a)	There is a significant correlation between frequency of exercise/physical activity and frequency of alcohol consumption.	Reject the null
Frequency of Exercise/Physical Activity (e) vs. Freq. of Driving Under the Influence of Alcohol (d)	There is no significant correlation between frequency of exercise/physical activity and frequency of driving under the influence of alcohol.	Fail to reject the null
Frequency of Alcohol Consumption (a) vs. Freq. of Driving Under the Influence of Alcohol (d)	There is a significant correlation between frequency of alcohol consumption and frequency of driving under the influence of alcohol.	Reject the null

Table 3. Results and Interpretation of Hypotheses Tests

DISCUSSION

As predicted from clinical experience, there appears to be little correlation between risky health behavior pairs in this healthy, young adult population. Although most correlations were statistically significant, they were quite small. However, this is to be expected, as only pairs of risky health behaviors were compared; stronger correlations would be expected for multiple behaviors compared in a polytomous logistic regression model. As it stands, the statistically significant correlations found in this study have clinical relevance as 'red flags' to stimulate further discussion about a patient's risky health behaviors.

Number of cigarettes smoked per day was only slightly correlated with frequency of alcohol consumption. In other words, a smoker is only slightly more likely to drink alcohol (r=0.148, p=0.000) than a non-smoker. The correlation between smoking and alcohol consumption is the strongest of all the risky behaviors studied. The presence of a relationship is not surprising. A given individual in this study is slightly more likely to drink alcohol if they smoke cigarettes. Put another way, for every 100 units of change in smoking frequency, there is a corresponding 14.8 units of change in frequency of alcohol consumption (and vice versa). In terms of clinical relevance, this should stimulate a physician to inquire about alcohol consumption when seeing a patient who smokes. However, the correlation is not strong enough for a physician to assume a patient is a drinker just because he smokes.

The association between smoking and driving under the influence of alcohol was also quite weak (r=0.029, p=0.000). There does not seem to be an intuitive link between these health behaviors, such as there is with alcohol consumption and driving under the influence of alcohol. Despite the minor correlation, this relationship has no apparent clinical significance, due to its marginal plausibility.

As might be expected, there was a negative correlation between degree of smoking and frequency of exercise. However, the correlation was unexpectedly small. According to the HEAR, smoking makes a given subject only slightly less likely to engage in exercise or physical activity (r=-0.046, p=0.000). This runs counter to public perception, which envisions smokers being (on average) unhealthy and out-of-shape. Conventional wisdom (and in truth, most physicians) would expect at least a moderate negative correlation, holding

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that as smoking frequency rises, exercise frequency falls. According to the HEAR data, this negative correlation is sufficiently weak to be considered clinically insignificant when excluding other contributing factors. Thus, in the population under study, it would be a mistake to assume that even a heavy smoker does not engage in regular physical exercise. However, the correlation, albeit small, should stimulate discussion in the physician's office.

The smallest statistically significant correlation found was between frequency of exercise and frequency of alcohol consumption. Individuals who consume alcohol are only slightly less likely to exercise than those who abstain (r=0.019, p=0.000). This relationship is much like the comparison of smoking and exercise, in that conventional wisdom largely expects heavy drinkers to be unhealthy and physically unfit. This impression seems less defined than the public perception of smokers, in that smoking generally has a more directly observable effect (a degenerating liver doesn't present as obviously as chronic obstructive pulmonary disease). Put another way, developing cirrhosis generally doesn't make you stop running on the basketball court in the same manner as an emphysematous cough. However, both the man on the street and the average physician would generally agree that heavy drinkers would be less likely to exercise than 'Tee-totalers' or light social drinkers. That opinion simply doesn't hold true for this population. The speculated reasons for this are much the same as for smoking, and are addressed below.

There was a significant correlation between frequency of alcohol consumption and frequency of driving under the influence of alcohol (r=0.118, p=0.000). It seems intuitive that the more frequently an individual drinks, the more frequently he would drive under the influence of alcohol. One would expect a frequent, heavy drinker to drive intoxicated much more often than a light social drinker. According to the HEAR data, there is not so dramatic a difference. When other contributing factors were excluded, frequency of alcohol consumption was only slightly correlated with frequency of driving under the influence, meaning heavy drinkers were only slightly more likely than light drinkers to drive intoxicated at a given frequency. Again, this statistic flies in the face of conventional wisdom. The USAF typically deals with DUI offenses by referring the offender for counseling for their "drinking problem". This correlation suggests that the current USAF

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policy should be reviewed. It is certainly true that a percentage of DUI offenders are heavy drinkers. However, the HEAR data show that heavy drinking is not a foregone conclusion for DUI offenders. DUI offenders are only slightly more likely to have a problem with excessive alcohol consumption than non-offenders. The problem seems to be related to poor judgment both before and during alcohol consumption.

No significant correlation was found between frequency of exercise and frequency of driving under the influence of alcohol (r=-0.004, p=0.314). It seems intuitive that there would be no correlation between these risky health behaviors. In epidemiologic terms, it simply isn't plausible that an individual's exercise habits would predispose him to driving under the influence of alcohol (unless, of course, the gym had a cocktail lounge). This was the only studied risky health behavior pair that lacked a statistically significant correlation. It also seemed the least intuitive of all the comparisons. The lack of significant correlation where a correlation is implausible serves to validate the significance of the other comparisons' results.

The null is rejected for all but one of the six distinct correlations. It follows that there exists for five of the correlations a small but statistically significant correlation between the risky health behaviors in question. Why are these correlations smaller than they seem they should be? Conventional wisdom would expect a much larger correlation for comparisons such as alcohol consumption and DUI. Why do the magnitude of these correlations seem to go against conventional medical wisdom and public perception? Part of the answer may lie in the nature of the data available and the statistical method used. The HEAR survey gathers ordinal data, not continuous. Any time data is organized into a categorical rather than continuous format, information is lost; subsequent statistical methods therefore yield more conservative results. A parametric method, such as Pearson's correlation, may have yielded stronger correlations. Furthermore, a polytomous logistic regression model, which controls for multiple risky health behaviors, might shed some light on the combined influence of these risky health behaviors both on each other and other health outcomes.

Another factor in the deceptively small correlations may lie in the population under study. This study deals with young adults (ages 20-30) who, on average, have different

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habits than the population at large. They tend to exercise more, and their social activities tend to be different than older adults. In addition, there are cultural differences between the United States Air Force and American society at large. The USAF has a venerable and dominant culture, which revolves around individual membership in a larger group [9]. This often manifests itself in competition between functional groups (Squadrons, Flights, etc.); this competition usually involves intramural sports. This combined with extensive, no-cost exercise facilities results in increased frequency of exercise for individuals that might not otherwise do so. The pro-exercise atmosphere is also fostered by the fitness requirements for service members, requiring a modicum of fitness for all USAF members. Another contributing factor may be the social isolation that can result from military service. This isolation can be particularly evident in young, single enlisted personnel who leave school, family and friends to enlist in the USAF. Once settled into base life, enlisted personnel can engage their peers in several after-hours activities. Among these activities are sports and exercise (basketball, intramurals, etc.) and socializing at the enlisted club. For these reasons, exercise has more bearing on social and professional life in the USAF than it does in society at large; not only is it required for continued employment, but also it is frequently a means to prevent social isolation. This results in a greater average frequency of exercise for a given individual, and is likely the reason for the smaller-than-expected correlation between frequency of exercise and other risky health behaviors. It is reasonable to expect that USAF members engaging in risky health behaviors exercise, on average, more than their civilian counterparts. Further studies of these same risky behaviors in society at large are needed to corroborate this belief. Clinical experience shows that some smokers in the USAF even 'compensate' for their unhealthy habit by increasing their frequency of exercise.

By the same measure, alcohol consumption was positively correlated with frequency of exercise. There are many possible reasons for this correlation. In the current operational tempo of the USAF, most members are working longer hours packed with heavier and more diverse duties. Alcohol is inevitably used in this atmosphere to help individuals 'unwind' after hours. In addition, military members are, by nature, isolated from civilian culture [9]; it follows that free time is spent, by and large, with military peers. In this vein, alcohol

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consumption has always been a part of the military culture, and is a very popular pastime. Examples of this are the tradition of drinking from beer steins emblazoned with the squadron insignia at the officer's club, and the presence of alcohol at virtually every USAF intramural sporting event (before, during and after). In fact, the consumption of alcohol is codified as an essential part of certain official USAF functions, such as the Dining-In [10].

The positive correlation between smoking and alcohol consumption is not surprising. After all, consumption of these products usually occurs in the same type of place (bar, social club, home, restaurant). Interesting is the fact that this correlation was the strongest of all risky health behavior pairs. Despite our best efforts, cigarette smoking and drinking to excess are still socially acceptable activities, especially among enlisted members. More interesting is the lack of strong correlation between frequency of alcohol consumption and frequency of driving under the influence of alcohol. This may be due to under-reporting of alcohol consumption, DUI, or both. The effect of this potential under-reporting is hard to determine. Nonetheless, the lack of strong correlation is surprising. As previously stated, conventional wisdom holds that drunk drivers tend to be 'problem drinkers' rather than light social drinkers. This analysis argues against that, at least for the USAF. Several things could account for this weaker-than-expected correlation, one of which could be under reporting of alcohol consumption and/or DUI. Another explanation could lie in the ubiquitous nature of alcohol consumption in the USAF. It is possible that DUI is a more widespread problem than is revealed by the Security Forces blotter. Perhaps public perception is molded by the actions of 'problem drinkers' who drive under the influence, while social drinkers who drive with a 'buzz' may not alert as much suspicion with either police or their friends. After all, a drunk driver who crashes his car will draw much more attention than a tipsy driver who arrives home without incident. Both of these drivers, however, fall under the classification of "driving under the influence of alcohol". Regardless the reason, this analysis shows that driving under the influence is not just a problem for heavy drinkers, but is found in the full spectrum of alcohol consumers. This may indicate a substantially more widespread DUI problem than is currently perceived in the USAF.

Despite the best efforts of Commanders and the Medical Corps, smoking continues to be a rampant problem in the United States Air Force. Cigarettes have, until recently, been a part of military culture. A 'pack of Luckys' was provided in every kit of World War II field rations. Until several years ago, basic trainees who smoked were allowed 'smoke breaks', while non-smokers were required to continue working and training. To add insult to injury, basic trainees on smoke breaks were required to smoke, to justify being on break. To this day, smoking pavilions are juxtaposed to every building on every Air Force Base. Active duty members who smoke are given smoking breaks, while non-smokers are typically not given equal break time.

In the past few years, however, the USAF has made great strides in decreasing smoking among its members. The new Preventive Health Assessment (PHA) and Putting Prevention Into Practice (PPIP) programs require physicians to inquire about smoking during every patient encounter, and to provide a referral for smoking cessation if the patient is interested. The USAF Tobacco Cessation Program combines behavioral therapy with medication (if needed). This strategy has helped even reticent smokers quit, despite past failures to quit smoking.

Despite these strides, smoking remains a problem. The difficulty in decreasing the number of smokers is likely contributed to by the relatively weak correlation with other individual risky health behaviors. If smoking were highly correlated with heavy drinking or infrequent exercise, it would stand to reason that heavy smokers would be quite unhealthy. This poor health, particularly in young adults, would provide a touchstone for physicians, friends and supervisors to entreat, persuade, and even force smokers to stop smoking. Likewise, a strong correlation between smoking and DUI would allow an opportunity to broach smoking cessation during the mandatory USAF counseling which follows a DUI offense. Perhaps future studies may discover strong correlations between groups of risky health behaviors, as opposed to the pairs studied here. Even if these group correlations are found to exist, it seems that the more risky behaviors are included in a risk group, the less frequently a 'red flag' would be raised to the attending physician to inquire about other risky health behaviors. Put another way, a physician is more likely to recognize a predicted risky

health behavior if he is alerted by a smoking history alone, versus a combination of smoking, alcohol consumption, and exercise frequency.

CONCLUSION

There are two ways to view the correlations generated during this analysis. On one hand, it is good that the studied risky health behaviors are not strongly correlated; persons engaging in one 'vice' are not necessarily more likely to engage in another. On the other hand, strongly correlated risky health behaviors would be desirable, as this would be a more predictable model. It would make prevention more of a 'one-stop shopping' experience. Heavy smokers would be more likely to be heavy drinkers or physically unfit, and could also be more likely to drive under the influence of alcohol. Prevention could subsequently be directed to all behaviors simultaneously. In addition, these unhealthy and physically unfit persons would be fairly obvious to physicians, friends and supervisors. Occasional smokers, closet alcoholics and physically unfit persons are sometimes hard to spot; heavy smokers who drink to excess and are physically unfit are usually easier to recognize.

This study demonstrates that, at least for the USAF, risky health behavior pairs are significantly but weakly correlated. Due to the distinct culture of the USAF, it may be a mistake to generalize these results to American society at large. In order to corroborate these results outside the USAF, a survey of the health behaviors of young adults in the US at large should be analyzed in a similar fashion. The results of this exploratory study should be followed and corroborated by further studies using both HEAR data and other instruments. The next step is to determine if these risky health behaviors (both individually and collectively) are predictive of poor health in this young adult population. It would also be interesting to compare these results to those for a selected sample of this USAF population, such as those in the aviation community.

APPENDICES

APPENDIX A

BROOKS AIR FORCE BASE INSTITUTIONAL REVIEW BOARD DOCUMENTATION

DEPARTMENT OF THE AIR FORCE
USAF SCHOOL OF AEROSPACE MEDICINE (AFMC)
BROOKS AIR FORCE BASE TEXAS

0 5 NOV 1999

MEMORANDUM FOR USAFSAM/AF
　　　　　　　　ATTN: CAPT W. MARK MATTHEWS

FROM: USAFSAM/GE

SUBJECT: Approval of Exempt Study (#F-BR-2000-0012-E)

1. Dr Krock, Chair of the Brooks Institutional Review Board, and Col Marden, Director, Surveillance Directorate have reviewed and approved your project titled **"Correlation Between Smoking and Other Poor Health Behaviors in Young Smokers"** for exemption.

2. You may being your research at your discretion.

Jane E. Marquardt
JANE E. MARQUARDT
Protocol Administrator

Attachments:
1. Opt Form 310
2. Dr Krock's Ltr, dtd 6 Oct 99
3. Exempt Protocol

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INSTITUTIONAL REVIEW BOARD
Brooks Air Force Base, Texas 78235

:

TO: W. MARK MATTHEWS, USAF, MC, FS (USAFSAM/AF)

RE: Request for Exemption of IRB Oversight for Project

DATE: OCTOBER 6, 1999

1. I have reviewed your thesis proposal outline and the attached materials describing your Aerospace Medicine Residency-Phase I project entitled "Correlation between smoking and other poor health behaviors in young smokers".

2. As described in the information provided in your proposal, this project qualifies for exemption from IRB oversight under 32 CFR 219.101 (b) (4). Please ensure as outlined in your letter, that subject identifiers are removed from the data, thus protecting subject confidentiality.

3. This exemption will be formally recorded in the minutes of the next meeting of the Brooks Institutional Review Board.

Larry P. Krock, Ph.D.
Chair, Brooks IRB

CHAIR: Larry P. Krock, Ph.D.   USAFSAM/AFI 1 210 536 3281

ADMINISTRATOR: Jane Marquardt   AFRL/HEOA 1 210 536 4113

Protection of Human Subjects
Assurance Identification/Certification/Declaration
(Common Federal Rule)

Policy: Research activities involving human subjects may not be conducted or supported by the Departments and Agencies adopting the Common Rule (56FR28003, June 18, 1991) unless the activities are exempt from or approved in accordance with the common rule. See section 101(b) the common rule for exemptions. Institutions submitting applications or proposals for support must submit certification or appropriate Institutional Review Board (IRB) review and approval to the Department or Agency in accordance with the common rule.	Institutions with an assurance of compliance that covers the research to be conducted on file with the Department, Agency, or the Department of Health and Human Services (HHS) should submit certification of IRB review and approval with each application or proposal unless otherwise advised by the Department or Agency. Institutions which do not have such an assurance must submit an assurance and certification of IRB review and approval within 30 days of a written request from the Department or Agency.

1. Request Type	2. Type of Mechanism	3. Name of Federal Department or Agency and, if known, Application or Proposal Identification No.
☐ ORIGINAL	☐ GRANT ☐ CONTRACT ☐ FELLOWSHIP	
☐ FOLLOWUP	☐ COOPERATIVE AGREEMENT	
☒ EXEMPTION	☒ OTHER: USAFSAM/AF	USAF, #F-BR-2000-0012-E

4. Title of Application or Activity	5. Name of Principal Investigator, Program Director, Fellow, or Other
Correlation Between Smoking and Other Poor Health Behaviors in Young Smokers	Capt (Dr) W. Mark Matthews
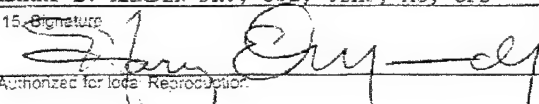
6. Assurance Status of this Project *(Respond to one of the following)*

☐ This Assurance, on file with Department of Health and Human Services, covers this activity:
Assurance identification no. M-_____ IRB Identification no. _____

☐ This Assurance, on file with *(agency/dept)*_____, covers this activity.
Assurance identification no._____ IRB Identification no._____ *(if applicable)*

☐ No assurance has been filed for this project. This institution declares that it will provide an Assurance and Certification of IRB review and approval upon request.

☒ Exemption Status: Human subjects are involved, but this activity qualifies for exemption under Section 101(b), paragraph __(4)__.

7. Certification of IRB Review (Respond to one of the following IF you have an Assurance on file)

☒ This activity has been reviewed and approved by the IRB in accordance with the common rule and any other governing regulations or subparts on *(date)* 6Oct99 by: ☐ Full IRB Review or ☒ Expedited Review

☐ This activity contains multiple projects, some of which have not been reviewed. The IRB has granted approval on condition that all projects covered by the common rule will be reviewed and approved before they are initiated and that appropriate further certification will be submitted.

8. Comments

9. The official signing below certifies that the information provided above is correct and that, as required, future reviews will be performed and certification will be provided.	10. Name and Address of Institution
11. Phone No. *(with area code)* 12. Fax No. *(with area code)*	Armstrong Research Site 2509 Kennedy Circle
(210) 536-4356 (210) 536-2638	Brooks AFB, TX 76235-5118
13. Name of Official HARRY E. MARDEN JR., Col, USAF, MC, CFS	14. Title Director (AIO) Surveillance Directorate
15. Signature	16. Date 4 NOV 99
Authorized for local Reproduction	OPTIONAL FORM 310 (Rev. 1-95) Sponsored by HHS/NIH

APPENDIX B

MEMORANDUM OF PERMISSION TO USE HEALTH ENROLLMENT ASSESSMENT REVIEW DATA

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE MEDICAL OPERATIONS AGENCY
BROOKS AIR FORCE BASE, TEXAS

MEMORANDUM

W. Mark Matthews, MD
Capt, USAF, MC, FS
Resident, Aerospace Medicine

FROM: Anthony Robbins, MD, PhD

Use of HEAR Data by W. Mark Matthews, MD

DATE: 11 February 2000

Capt. W. Mark Matthews, MD is hereby granted permission to analyze the data collected through the United States Air Force Health Enrollment Assessment Review (HEAR) for his thesis titled, "The Relationship Between Smoking and Other Poor Health Behaviors in a Young Healthy Population". The owner of this data is the Office for Prevention and Health Services Assessment (OPHSA), Air Force Medical Operations Agency (AFMOA), Brooks Air Force Base, Texas.

The data set to be used was collected with the approval of the Brooks AFB Institutional Review Board. The data is being provided to Dr. Matthews without identifiers. Please contact me at (210) 536-6509 with further questions.

Sincerely,

ANTHONY S. ROBBINS, Major, USAF, MC
Physician Epidemiologist

APPENDIX C

UNITED STATES AIR FORCE HEALTH ENROLLMENT ASSESSMENT REVIEW
(HEAR)

HEAR SURVEY REPRODUCED WITH PERMISSION OF THE OFFICE FOR
PREVENTION AND HEALTH SERVICES ASSESSMENT, AIR FORCE MEDICAL
OPERATIONS AGENCY, BROOKS AIR FORCE BASE, TEXAS

≡ *TRICARE* ≡ **SOUTHWEST**
Quality Care for the Uniformed Services

Health Enrollment
Assessment Review
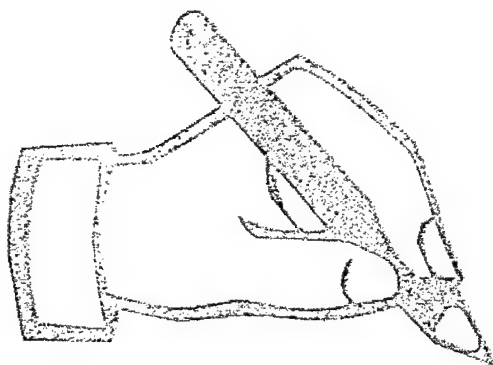
This questionnaire was developed by the Office for Prevention and Health Services Assessment (OPHSA), the
National Center for Environmental Health (NCEH), and the Battelle Memorial Institute for TRICARE Region VI
and IV through a Memorandum of Agreement between Armstrong Laboratory Human Services Command, U.S.
Air Force Material Command, and the Centers for Disease Control and Prevention (CDC).

Health Enrollment Assessment Review (HEAR)
INSTRUCTIONS

General Instructions:

Please use a No. 2 pencil or darker to complete the survey. Make dark black marks that fill the response circles completely. If you make a mistake, erase the incorrect mark and fill in the correct circle.

Example:　　　Correct　　　Incorrect

○ ● ○　　　 ⊘ ○ ◔

Here is an example of how someone born on June 23, 1971 would answer question A1.

A1.DATE OF BIRTH:
(YEAR / MONTH / DAY)

19 [7][1] / [0][6] / [2][3]

Here is an example of how someone 6 feet 2 inches tall would answer question A6.

A6.Without shoes, about how tall are you?

[6] feet　　　[0][2] inches

Health Enrollment Assessment Review (HEAR)
INSTRUCTIONS *(Continued)*

Please **answer all appropriate questions** and complete the entire survey. However, you should skip questions where the survey says to do so. For example, males should not answer the female questions, and non-smokers should not answer the smoking questions.

> Example: In the illustration below, we have answer "not at all" to question G2. Therefore we will skip the rest of the G section questions and go directly to question H1.

G2. Do you NOW smoke cigarettes every day, some days, or not at all?

     ○ Every day   ○ Some days   ● Not at all (go to H1)

Do not fold or staple the survey pages. Please complete the survey and **return it by mail within 5 days**, using the pre-addressed envelope provided.

Privacy Act Statement:

AUTHORITY: 10 U.S.C., 8013

PURPOSE: The health enrollment assessment review (HEAR) survey is designed to collect personal information from military health services system beneficiaries.

ROUTINE USES: This information is used primarily by health-care personnel to plan health care delivery needs. Information used in this survey will be sent only to you and your Primary Care Manager (PCM) and kept in your medical record. Other results from this survey will be provided only in combination with results from other enrollees and cannot be used to identify you.

DISCLOSURE: Completion of information in this survey is highly desirable, but not mandatory. Completion of the survey information will help your PCM design a plan of care. Preexisting medical conditions and other risk factors will in no way affect enrollment eligibility

TRICARE HEALTH ENROLLMENT ASSESSMENT REVIEW QUESTIONNAIRE

Your Social Security #:

Sponsor's Social Security #:

PCMID CODE

FIRST NAME

MI

LAST NAME

SEQUENCE ID 27338

LOCATION S02

69J335

TRICARE HEALTH ENROLLMENT ASSESSMENT REVIEW QUESTIONNAIRE

STREET ADDRESS (include apartment #)

CITY

STATE

ZIP CODE

FOR OFFICE USE ONLY

Please do not write or mark in this area.

LOCATION
S02

SEQUENCE ID
27338

64335

TRI ARE HEALTH ENROLL ENT
ASSESSMENT REVIEW QUESTIONNAIRE

A1. DATE OF BIRTH:
(YEAR /MONTH /DAY)

19 [ ] / [ ] / [ ]

```
0  OO   OO   OO
1  OO   OO   OO
2  OO   O    OO
3  OO   O    OO
4  OO   O    O
5  OO   O    O
6  OO   O    O
7  OO   O    O
8  OO   O    O
9  O    O    O
```

A4. Racial/Ethnic Background:

O Amer. Indian or Alaska Native
O Asian/Oriental
O Black, Hispanic
O Black, Non-Hispanic
O Pacific Islander
O White, Hispanic
O White, Non-Hispanic
O Other

A2. GENDER:

O Male
O Female

A3. MARITAL STATUS:

O Never married
O Married
O Separated
O Divorced
O Widowed

A5. Are you:

O Active duty service member
O Retired service member

OR Family Member of:

O Active duty service member
O Retired/deceased service member

OR

O Other

A6. About how tall are you, without shoes?

[ ] feet [ ] [ ] inches

```
3 O    0 OO
4 O    1 OO
5 O    2 OO
6 O    3 OO
7 O    4 OO
       5 OO
       6 OO
       7 OO
       8 OO
       9 OO
```

A7. About how much do you weigh, without shoes?

[ ] [ ] [ ] pounds

```
0 OOO
1 OOO
2 OOO
3 OOO
4 OOO
5 OOO
6 OOO
7 OOO
8 OOO
9 OOO
```

A8. Would you say that your health in general is...

O Excellent   O Fair
O Very good   O Poor
O Good

B 1. About how long has it been since you last had your blood pressure taken by a doctor, nurse, or other health professional?

O Less than 1 year ago   O 3 or more years ago
O 1 year ago   O Never
O 2 years ago   O Don't know

B2. Have you ever been told by a doctor or other health professional that you had hypertension, sometimes called high blood pressure?

O Yes (go to B3)   O Only during pregnancy (go to C1)
O No (go to C1)

B3. Have you been told two or more different times that you had hypertension or high blood pressure?

O Yes O No O Don't know

B4. Has any medicine ever been prescribed by a doctor for your hypertension or high blood pressure?

O Yes O No (go to C1) O Don't know (go to C1)

B5. Are you now taking any medicine prescribed by a doctor for your hypertension or high blood pressure?

O Yes O No (go to C1) O Don't know (go to C1)

B6. How regularly do you take your high blood pressure medicine?

O Always   O Less than half the time
O Most of the time   O Never
O About half the time

C1. Blood cholesterol is a fatty substance found in blood. Have you ever had your blood cholesterol checked?

O Yes (go to C2) O No (go to C4) O Don't know (go to C4)

C2. About how long has it been since you last had your blood cholesterol checked? O Less than 1 year ago O 5 years ago

O 1-2 years ago   O More than 5 years ago
O 3 -4 years ago   O Don't know

C3. Have you ever been told by a doctor or other health professional that your blood cholesterol is high?

O Yes O No O Don't know

C4. About how long has it been since you had a rectal exam?

O Less than 1 year ago   O 3 or more years ago
O 1 year ago   O Never
O 2 years ago   O Don't know

C5. During the past ten years, have you had a tetanus shot?

O Yes O No O Don't know

D1. In an average week, how many times do you engage in physical activity (exercise or work which lasts at least 20 minutes without stopping and which is hard enough to make you breathe heavier and your heart beat faster)?

O Less than 1 time per week   O At least 3 times per week
O 1-2 times per week

D2. How much hard physical work is required on your job? Would you say...

O A great deal   O None
O A moderate amount   O Not currently working
O A little

D3. How much hard physical work is required in your main daily activity (household or other non-job activities)? Would you say...

O A great deal O A moderate amount O A little O None

T. CARE HEALTH ENROLLM IT
ASSESSMENT REVIEW QUESTIONNAIRE

. Women's Health (men 20 to F1)

1. About how long has it been since you had a breast examination
y a doctor or other health professional?
O Less than 1 year ago   O 3 or more years ago
O 1 year ago   O Never
O 2 years ago   O Don't know

2. A mammogram is an x-ray of each breast to look for breast
ancer. Have you ever had a mammogram?
O Yes O No (go to E4) O Don't know (go to E4)

3. How long has it been since you had your last mammogram?

O Less than 1 year ago   O 3 or more years ago
O 1 year ago -----------O Don't know.
O 2 years ago

4. A Pap smear is a test for cancer of the cervix. Have you ever
ad a Pap test (or Pap smear)?
O Yes O No (go to G1) O Don't know (go to G1)

5. How long has it been since you had your last Pap smear?
O Less than 1 year ago   O 3 or more years ago
O 1 year ago   O Don't know
O 2 years ago

. Men's Health (women go to G1)

1. How long has it been since you had a testicular examination by a
octor or other health care professional?
Less than 1 year ago   O 3 or more years ago
1 year ago   O Never
2 years ago   O Don't know

1. Have you smoked at least 100 cigarettes in   O Yes
our entire life? (Note: 1 pack = 20 cigarettes)   O No (go to H1)

2. Do you NOW smoke cigarettes every day, some days, or not at all?
O Every day O Some days O Not at all (go to H1)

3. On the average, about how many cigarettes a day do you now
moke?
O Less than 1 per day   O 21-40 per day
O 1-10 per day   O 41 or more per day
O 11-20 per dayO Don't know

4. Are you seriously intending to quit   O Yes   O No
moking in the next 6 months?
5. Are you planning to quit smoking in the   O Yes   O No
ext month?
6. Have you tried to quit smoking in the   O Yes   O No
ast 12 months?

1. During the past month, have you had at least one drink of any
lcoholic beverage such as beer, wine, wine cooler, or liquor?
O Yes O No (go to I1) O Don't know

H2. In the past two weeks, on how many days did you drink any
alcoholic beverages, such as beer, wine, or liquor?
O None (go to H4)   O 5-6 days
O 1-2 days   O 7 or more days
O 3-4 days   O Don't know

H3. A drink is 1 can or bottle of beer, 1 glass of wine, 1 can or bottle of
wine cooler, 1 cocktail, or 1 shot of liquor. During the past 2 weeks, on
the days when you drank, how many drinks did you drink on average?
O 1-2 drinks   O 7 or more drinks
O 3-4 drinks   O Don't know
O 5-6 drinks

H4. During the past month, how many times have you driven when
you've had perhaps too much to drink?
O None
O 1-2 times   O 7 or more times
O 3-4 times   O Don't drive
O 5-6 times   O Don't know

H5. During the past month, have you thought   O Yes   O No
you should cut down on your drinking of alcohol?

H6. During the past month, has anyone   O Yes   O No
complained about your drinking?

H7. During the past month, have you felt   O Yes   O No
guilty or upset about your drinking?

H8. During the past month, was there at least O Yes   O No
one day on which you had five or more drinks
of beer. wine. or liquor?

I1. How often do you feel that your present work or lifestyle is putting
you under too much stress?
O Often O Sometimes O Seldom O Never

I2. During the past 2 weeks, would you say that you experienced...
O A lot of stress
O A moderate amount of stress
O Relatively little stress
O Almost no stress at all

I3. In the past year, how much effect has stress had on your health?
O A lot O Some O Hardly any or none

J1. In general, how satisfied are you with your life (e.g., work situation,
social activity, accomplishing what you set out to do)?
O Not satisfied   O Mostly satisfied
O Somewhat satisfied   O Totally satisfied

J2. How often do you have any serious problems dealing with your
husband or wife, parents, friends, or with your children?
O Often O Sometimes O Seldom O Never

J3. During the past year, have you been separated from your family for a
block of at least 30 days?
O Yes O No

■ **S02**   **27338**
  LOCATION   **SEQUENCE ID**

Please do not write or mark in this area.

TRICARE HEALTH ENROLLMENT
ASSESSMENT REVIEW QUESTIONNAIRE

In the past month, have you often been bothered by...

K1. ...little interest or pleasure in doing things?　　O Yes　O No

K2. ...feeling down, depressed, or hopeless?　　O Yes　O No

K3. ..."nerves" or feeling anxious or on edge?　　O Yes　O No

K4. ...worrying about a lot of different things?　　O Yes　O No

K5. During the past month, have you had an　　O Yes　O No
anxiety attack (suddenly feeling fear or panic)?

K6. During the past 12 months, have you　　O Yes
seen a mental health professional?　　O No
　　O Don't know

L1. During the past two weeks, how many days did you stay in bed
for more than half of the day because of illness or injury?
　O None　　O 5-6 days
　O 1-2 days　　O 7 or more days
　O 3-4 days　　O Don't know

L2. During the past two weeks, how many days did you miss more
than half of the day from your job or business because of illness or
injury?
　O None　O 5-6 days
　O 1-2 days　O 7 or more days
　O 3-4 days　O Don't know

L3. Do you have difficulty walking such as　　O Yes　O No
hobbling, shuffling, or not being able to walk a
straight line?

M1. How many different prescription medications are you currently
taking?
　O None　　O 6 or more medications
　O 1-2 medications　　O Don't know
　O 3-5 medications

M2 & M3. Excluding visits for pregnancy, medication refills, and dental
care, how many times did you see a doctor, nurse, or other health care
professional for an office visit or clinic appointment? (Include both
civilian and military health care professionals. Only include visits for
yourself.)

during the PAST MONTH	during the PAST 12 MONTHS
O None	O None
O 1-2 visits	O 1-5 visits
O 3-4 visits	O 6-10 visits
O 5-6 visits	O 11-15 visits
O 7 or more visits	O 16-20 visits
O Don't know	O 21 or more visits
	O Don't know

M4. During the past 12 months, how many times have you gone to an
emergency room or urgent care clinic?
　O None　　　O 5-6 visits
　O 1-2 visits　　O 7 or more visits
　O 3-4 visits　　O Don't know

M5. During the past 12 months, have you spent　　O Yes
one or more nights in the hospital? (Do not　　O No (go to N1)
include hospitalizations for deliveries.)

M6. During the past 12　　O 1-2 nights　　O 7 or more nights
months, how many nights have　O 3-4 nights　　O Don't know
you spent in the hospital?　　O 5-6 nights

M7. During the past 12 months, on how　　O 1 time
many different occasions have you entered　　O 2-3 times
the hospital and stayed for at least one　　O 4 or more times
night?　　O Don't know

Have you ever been told by a health care provider that you have..

N1. ...diabetes or sugar diabetes?　O Yes　O No　O Don't know

N2. ...had a stroke?　O Yes　O No　O Don't know

N3. ...had a heart attack?　O Yes　O No　O Don't know

N4. ...emphysema/chronic　O Yes　O No　O Don't know
bronchitis?

N5. ...arthritis?　O Yes　O No　O Don't know

N6. ...Parkinson's disease or other　O Yes　O No　O Don't know
neurologic disease?

N7. ...depression?　O Yes　O No　O Don't know

N8. ...HIV or AIDS?　O Yes　O No　O Don't know

N9. ...anxiety or personality　O Yes　O No　O Don't know
disorder?

N10. ...cancer?　O Yes　O No　O Don't know

N11. ...heart disease or angina?　O Yes　O No　O Don't know

N12. ...liver disease?　O Yes　O No　O Don't know

N13. ...kidney disease?　O Yes　O No　O Don't know

N14. ...a stomach ulcer?　O Yes　O No　O Don't know

N15. ...asthma?　O Yes　O No　O Don't know

N16. During the past 12 months, have you seen a　　O Yes
health care provider on 2 or more occasions for a　　O No
bone, joint, back, or muscle problem?

N17. Do you have a dependent family member less　　O Yes
than 18 years old with a serious medical condition?　　O No

N18. Do you have a close family member (parent,　　O Yes
brother/sister, or child) who has or had angina' a heart　O No
attack, or other heart disease?　　O Don't know

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VITA

Captain Walter Mark Matthews, MD was born in Austin, Texas. He graduated with honors from Round Rock High School in Round Rock, Texas in June 1988. He received a Bachelor of Arts in Biology/Pre-Health Care from Baylor University in Waco, Texas in May 1992. He received a Doctorate of Medicine from Baylor College of Medicine in Houston, Texas in May 1996. After entering active duty in the United States Air Force in 1996, Captain Matthews completed a Transitional Internship at Wilford Hall Medical Center in June 1997. Captain Matthews' Societal Memberships include the Aerospace Medical Association, the Society of US Air Force Flight Surgeons, and the Christian Medical and Dental Society. He is a USAF Flight Surgeon with 105 flight hours in 3 different aircraft.

Captain Matthews is currently a Resident in Aerospace Medicine (Phase I) stationed at Lackland AFB, TX. As an Aerospace Medicine Resident, or RAM, Capt Matthews is preparing for leadership in the field of Aerospace Medicine, receiving training in public health, aerospace and occupational medicine. He is currently assigned to AFROTC Detachment 842 at the University of Texas at San Antonio. Captain Matthews was previously attached to the 86th Flying Training Wing, Laughlin AFB, Texas.

Captain Matthews is married to Monica (Kreupeling) Matthews and has two daughters, Kaelyn (3 yrs) and Brooke (18 months).

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This thesis was typed by Walter Mark Matthews.